**Portfolio**: Aerospace

**Division**: Aerospace Engine Systems

**Work Location**: Trollhättan

**Legal Employee Entity**: GKN Aerospace Sweden AB

**Vacancy Title**: Master Thesis in Topology Opimization

**Justification:** Andreas Borg

# Role Purpose

**Om GKN Aerospace**:

*GKN Aerospace is the aerospace operation of GKN plc, serving a global customer base and operating in North America and Europe. With sales of £2.2 billion in 2014, the business is focused around three major product areas - aerostructures, engine products and transparencies, plus a number of specialist products - electro-thermal ice protection, fuel and flotation systems, and bullet resistant glass. The business has significant participation on most major civil and military programmes. GKN Aerospace is a major supplier of integrated composite structures, offers one of the most comprehensive capabilities in high performance metallics processing and is the world leading supplier of cockpit transparencies and passenger cabin windows.*

**Projektbakgrund**:

GKN aerospace is working in a set based multi disciplinary design environment. The design system is constantly evolving, integrating CAE tools to provide decision support in new and onging development programs. The use of Topology optimization in aerospace structures has increased rapidly over the last year although there are still challenges to include multi disciplinary criterias in the optimization process.

# Key Responsibilities

**Proposed thesis title:**

**Period of time and amount of credits: *30 credits/20 weeks.***

**Number of students:** 1

**Start date:** Spring 2018

**Uppdragsbeskrivning***.*

This thesis assignment aims to further study the capabilities of topology optimization in the context of the GKN engineering environment and in particular for aerospace structural components.

Case description for the development of topological optimization methods to support design of structural aerospace components.

Use “Topology optimization” to identify the optimum load carrying structure with respect to the following goals:

* Minimum weight
* Minimum cost

Including GKN constraints such as:

* Stiffness
* Ultimate load
* Fatigue
* Aerodynamic performance
* Behavior in a high temperature environment
* Manufacturability under GKN’s cutting edge production technology

The objective for the use case is to identify how a component’s Life Cycle Simulation (LCS) may look for a range of options for future engines where the requirements may vary for the properties that are to be delivered to the component module and engine system. The result of the use case work is also to study the influence of the model, settings, analysis options and post-processing in the outcome of a Topology optimization study and how this outcome can be more effectively applied when aiming to a final product.

Thesis targets:

* Literature review
* Familiarization with methods and tools currently used within GKN Aerospace.
* Determine preferred approach(es) and present pros and cons to support the conclusion.
* Set up and demonstrate a working approach.
* Document the results in a thesis Report. (English)
* Present the summary and conclusions for an audience at GKN Aerospace. (English)

# Qualifications/Experience/Skills

Recommended academic background: Mechanical engineering including courses in meshing techniques, CAD and programming.

Send CV and personal letter to Petter Andersson (Petter.andersson@gknaerospace.com)

**Function**: **Employee Type**: Intern/Co-op

**Advertising start date (External &Internal):** 2017-10-05

**Advertising end date (External & Internal):** 2018-01-15